Illinois

WEST FORK WATERSHED ANALYSIS ITERATION 1.0 RESULTS

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WEST FORK ILLINOIS RIVER
WATERSHED ANALYSIS
RESULTS
Iteration 1.0
June 1997

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INTRODUCTION

The West Fork Illinois River Watershed Analysis was initiated in 1997 to provide an ecological context for proposed minerals development, including management recommendations. The West Fork watershed comprises 77,000 acres in the southwestern portion of the Illinois Valley Ranger District, Siskiyou National Forest (see Vicinity Map on Cover). The focus of Iteration 1.0 is the serpentine portion of the watershed. "*Serpentine*" is a general term that refers to an environment influenced by the unique chemical composition of the parent materials (serpentinite and peridotite). The species composition and vegetation structure reflect the influence of the underlying rocks. The vegetation within serpentine environments differs, sometimes dramatically, from other habitats common to Forests that also support late-successional associated species such as the spotted owl.

> "Many rare species of plants owe their origin to the selective pressures exerted by serpentine soils. The red rocky soils...are high in magnesium and heavy metals and are calcium-deficient. Many regionally common species find the soils intolerable. The structure and the composition of the [plant] communities offer a distinct and unique ecosystem that stands out abruptly from the non-serpentine matrix."[1]

Serpentine environments vary, but are generally incapable of providing high quality late-successional habitat, because the trees are too small or too sparse. Serpentine habitats have not provided many commercial timber harvest opportunities for the same reason.

The *Josephine Ultramafic Sheet*[2] extends north into Josephine Creek and south into Del Norte County (Irwin 1966). It is thought to be the largest and most complete exposure of this type on a continental land mass (Orr and Baldwin 1992). The deeper, more weather soils on the sheet are associated with nickel laterite deposits. The deposits have been prospected since the 1940's. Since the 1950's, extensive exploration of the Rough and Ready Creek deposits led to road development; scattered small pits were excavated at that time. A Plan of Operations for continued minerals development in this drainage has been submitted to the Forest Service.

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[1]From *Rough and Ready Creek Watershed: unique values,* Nature Conservancy, D. Borgias, Jan. 1997.

[2]The term ultramafic is used to describe rocks with high concentrations of heavy minerals such as iron, chrome, nickel, etc.

The Josephine Ultramafic Sheet is famed for its variety of rare plants, many endemic to the sheet itself. In recognition of the unique plant life federal land allocations such as Late-Successional Reserve, Area of Critical Environmental Concern (ACEC), Botanical Area, Wilderness, and Administrative Study Area emphasize the intention to maintain viable populations of endemic species (see federal land allocation map). The West Fork Watershed was recently named #1 for rare species based on a Oregon Natural Heritage Program consideration of 1,400 fifth field watersheds in Oregon (Personal Communication, Kagan 1997).

About 60 percent (western two-thirds) of the West Fork watershed is dominated by serpentine. In this sense, it differs from watersheds previously studied on the east side of the Illinois Valley Ranger District: East Fork Illinois River, Althouse Creek, and Grayback/Sucker. The non-serpentine portion of this watershed will be treated briefly in this iteration. The issues, conditions and trends, and other considerations related to the non-serpentine portion are similar to those discussed in the east side analyses.

SUMMARY FINDINGS

- Physical processes are complex in this watershed.
- Basin and Range topography is unusual for Siskiyou province (uplift and broad alluvial fan with distributary drainage pattern).
- Elk Creek has an unusually long distance of low gradient.
- The dominant erosion process in serpentine, over a long time scale, is large landslides. Gully erosion significant over shorter time frames and smaller spatial scale.
- The character of the West Fork changes below its confluence of Rough and Ready Creek. The river becomes less vegetated and gravel bars are more prevalent.
- Deeply weathered, fine textured soils have developed in the watershed. Steep road grades, cut banks and other disturbance that concentrates water in these areas may lead to erosion, sediment delivery, and potential water quality impacts.

- The West Fork watershed is #3 priority for fish restoration in the Illinois Valley Watershed Action Plan (Soil and Water district, Watershed Council).
- Elk and Wood Creeks provide the best coho habitat in the watershed.
- For most of the West Fork watershed, water temperature is the primary limiting factor for salmonid production.
- Streams flowing through serpentine are inherently low on fish habitat attributes (e.g. cold water, spawning gravels, adequate flow, large wood). Few coho are expected to be produced in streams flowing through predominantly serpentine terrain due to seasonal water temperatures that range from sublethal to lethal and extremely low flows. Large wood production is also limited in serpentine.
- Some water diversions (including Seats Dam and Wings and Ferron Ditch) are barriers to juvenille salmonid migration during seasonal low flows.
- Valley floor development has reduced habitat complexity in low gradient reaches that are important for fish production.

- Elk Creek's low gradient and inherent productivity make it the focus of habitat maintenance and restoration. The low gradient reaches are generally in private ownership.

- The West Fork watershed provide outstanding botanical resources; 45 plants considered rare in Oregon grow within the watershed.
- Nine of these species are considered particulary uncommon. A significant portion of the range of these species is in the West Fork watershed.
- The active alluvial portions of Rough and Ready Creek provide habitat for high concentrations of rare plants.
- Botanists have identified unique hybrids of manzanita and ceanothus in this watershed.

- Port-Orford-cedar root disease has been identified in the headwaters of Whiskey Creek. The source of the infestation appears to be within a rock quarry on Forest Service land. Infestation is also known in Wood Creek and portions of Elk Creek and the West Fork itself, and in the adjacent Smith River and Chetco River watersheds.

- Wildlife species associated with ***older interior*** (see Terrestrial Analysis for definition) forests are far less abundant in serpentine.
- Riparian areas and non-serpentine inclusions provide the little interior forest habitat existing in Rough and Ready and the upper West Fork subwatersheds.
- Elk and Wood Creek subwatersheds, in the non-serpentine terrain, provides the best older interior forest habitat in the watershed. Logging, wildfire, agriculture, and rural development have removed most of the largest trees once growing in the watershed.

DATA GAPS

- Complete biological information (distribution, abundance, reproduction, annual fluctuations, specific habitat information) is lacking for most plant and animal species. Comprehensive biological inventories have not been prepared for most of the watershed.
- Fish habitat conditions prior to construction of Seats Dam and the other diversions is unknown.
- Information about private land use history and condition is lacking (for Elk and Wood Creeks and the face drainages Woodcock, Mendenhall, and Parker Creeks). Extent of Port-Orford-cedar and POC root disease on streams within the Elk Creek subwatershed flowing through private property is largely unknown.
- Vegetation analysis has not been completed or overlayed with other resources to develop an integrated restoration and commodity output plan.
- The amount of pre-settlement pine-oak savannah in the watershed is unknown.
- The contribution of mining to the local economy is unknown.

MANAGEMENT RECOMMENDATIONS

The following management recommendations for data collection, restoration, and monitoring are based on the analysis findings or data needs. They have been compiled and prioritized by the interdisciplinary analysis team. These recommendations, along with the analysis findings, are likely to drive the purpose and need for future projects but are not in themselves decisions to implement any particular action.

Recommendations for Data Collection/Compilation/Analysis

- Summarize precipitation data to help define rainy season for drainage. *Medium Priority.*
- Plot isohyetal map for the West Fork watershed. *Low to Moderate Priority.*
- Research use of peridotite and sepentinized materials for road surfacing aggregate. Consider its durability and potential to break down to fines and produce sediment, as well as whether it may contain asbestos. *High Priority*.
- Analyze Elk Creek stream gauge data to determine peak flow trends over the period of record. *Long Term.*
- Determine depth to ground water and ground and surface water interactions in Rough and Ready Creek. Acquire Water Master data and interview people about their wells in the area. Complete synoptic flow measurements along Rough and Ready channel and diversion ditches to determine ground water discharge and recharge. *Moderate to High Priority,* depending on emerging issues.
- Confirm coho presence (or absence) in Rough and Ready Creek. Determine adult escapement numbers. *High Priority.*
- If listed fish species are present in Rough and Ready Creek, determine how Seats Dam may be affecting them. *High Priority.*
- If listed fish species are present on Rough and Ready Creek, determine location of cool water refugia using spot temperature measurements and temperature stratification within pools. *High Priority.*
- Map Rough and Ready channel shifts across its alluvial fan. Determine how highway bridge constriction may affect hydrology. Survey large wood on the fan to determine delivery proceesses and function. *Moderate Priority.*
- Use SHADOW model data to differentiate topographic from vegetative stream to determine effects on watershed temperature if POC within the Rough and Ready Creek watershed became infested with root disease. *Moderate Priority.*
- Use soils and botany specialists to evaulate rare plant distribution/habitat relationships. Overlay soils and botany maps to identify patterns. Initiate soils and botanical inventory of some undisturbed and previously disturbed nickel laterite deposits. *High Priority.*
- Review existing roads near fens to see if subsurface flow has been disrupted, determine possible restoration opportunities. *High Priority.*
- Evaluate feasibility of revegetation of laterite mining pits. *High Priority.*

- Complete West Fork watershed satellite imagery interpretation for fens. Complete multi-agency Conservation Agreement for fens. Use geo-hydro-soils input to delineate ground water influence areas around fens. *High Priority.*
- Consolidate interagency data bases (BLM, FS, Oregon Natural Heritage, etc) to evaluate rare plant species viability. Consider plants that are not currently on the sensitive list, but may be affected by cumulative actions. Work with BLM and USF&WS to evaluate whether the nine rarest species should have T&E candidate status. Complete Conservation Strategies for these nine species. *Long Term/High Priority.*
- Complete management plans for botanical areas, as specified in the Siskiyou National Forest Plan. *Long Term.*
- Survey and monitor noxious weeds presence/spread. Include noxious weed monitoring plan for projects in watershed. Pursue partnership with Bureau of Land Management to survey roads on federal lands within the watershed. *High Priority.*
- Prepare interagency (including private landowners) fuels/vegetation treatment plan for West Fork. *Long Term.*
- Work with private landowners in Elk Creek and Wood Creek to assess watershed sensitivity to disturbance and map Port-Orford-cedar and POC root disease. *Long Term.*
- Maintain federal partnership with to Community Economic Development organizations (such as the Community Response Team). Provide technical assistance in environmental impact assessment. *Moderate Priority.*
- Maintain partnership with Illinois Valley Soil and Water District and Watershed Council to levarage skills and positive effects on watershed restoration projects across ownerships. *Moderate Priority.*

Recommendations for Maintenance, Mitigation, and Restoration

- Limit minerals operating season (to mitigate for erosion and POC concerns) to keep road bed intact (strength of subgrade). *High Priority.*
- Avoid cold water input sites in road stream crossing locations. *High Priority.*
- Design roads (including mining roads) to disperse, rather than concentrate water to mitigate for erosion, POC concerns. *High Priority.*
- Improve efficiency of diversions to minimize evaporative losses and keep more water in the stream. Design gauging systems that hold water users to current rights. *Long Term/High Priority.*
- Focus instream fish enhancements on Elk Creek (primary opportunites may be on private land). *High Priority.*
- Maintain and restore (using silviculture) riparian habitat on Elk Creek wherever possible. Provide input to watershed council for potential projects on private land. *High Priority.*
- Maintain interim riparian reserve boundaries. Promote riparian projects that meet the Aquatic Conservation Strategy. *High Priority.*
- For new, improved, or reconstructed roads, use aggregate source that is free of noxious weeds and POC root disease. *High Priority.*

- Add BLM Section 9 to Botanical Emphasis Area and/or Area of Critical Environmental Concern. *High Priority.*
- Participate in public/interagency botanical interpretation projects. *Long Term.*
- Maintain POC sanitation and improve road drainage and surfacing on Wimer Road. Sanitize the Sourdough and Bearcamp Roads. *High Priority*.
- Restrict road access where possible to limit the spread of POC root disease.*High Priority*.
- Improve drainage, monitor and regulate use of McGrew trail and other four wheel drive spurs (old temp spurs that access headwaters of Rough and Ready and Whiskey Cr) to limit spread of POC root disease. *High Priority.*
- Consider some restrictions on winter use of the upper end of the Wimer Road (gate). Improve drainage all along the Wimer Road. *High Priority.*
- Refrain from using camp near Gateway Bug Station for mushroom collectors because it is infected with POC root disease. *Low to Moderate Priority.*
- Coordinate additional seasonal closures and off-highway vehicle use restrictions with the adjacent Smith River National Recreation Area. *High Priority*.
- Restrict traffic of roads developed for mining to mitigate for POC, botanical and erosion concerns. *High Priority.*
- Fuel treatment (including prescribed fire) on ridgetops to reduce vegetation density around fading pines. *Long Term.*
- Minimize forest encroachment in meadow and savannah habitats. Look for opportunities to use fuel treatments (prescribed fire) to maintain oak savannah. *Moderate Priority.*
- Elk Creek and Wood Creek are priority areas for restoration of older forests in low-elevation LSR. *Long Term.*

Monitoring Recommendations

* Compile Canyon burn monitoring data to help focus prescribed burning recommendations. *High Priority.*
* Use Cedar Log Flat data to help determine how 3 sensitive species also found in the West Fork respond to fire. Continue funding the Cedar Log study for longer than one year. *Long Term.*

WATERSHED CHARACTERIZATION

What Makes the West Fork Watershed Important to People

The West Fork watershed provides a wide diversity of opportunites for people. The area is reknowned for its outstanding botanical resources. Many people call the watershed their home and are sustained by the air and water quality or threatened by fire and flood. The livelihood of many people depends on the commodities produced within the watershed (timber, fish, special forest products, minerals). Water from the rivers and creeks is used to maintain economic development including farming, ranching, and the largest mill in the Illinois Valley.

The rivers and creeks flow exceptionally clear, and are warm in the summer, providing incomparable swimming for locals and visitors. People enjoy driving the rough 4-wheel drive roads in the watershed. Much of the watershed was considered in the RARE II analysis, and much of the area remains inaccessible by road. The watershed is the first view of Oregon for many visitors traveling northeast on Highway 199 from California.

Articles on the topic: ***Why the Rough and Ready Watershed is Important to Me*** was solicited from the public (see technical appendicies at the end of this document). About a dozen people submitted their views. Botanical resources and the wild, primitive environment was cited in most of the letters.

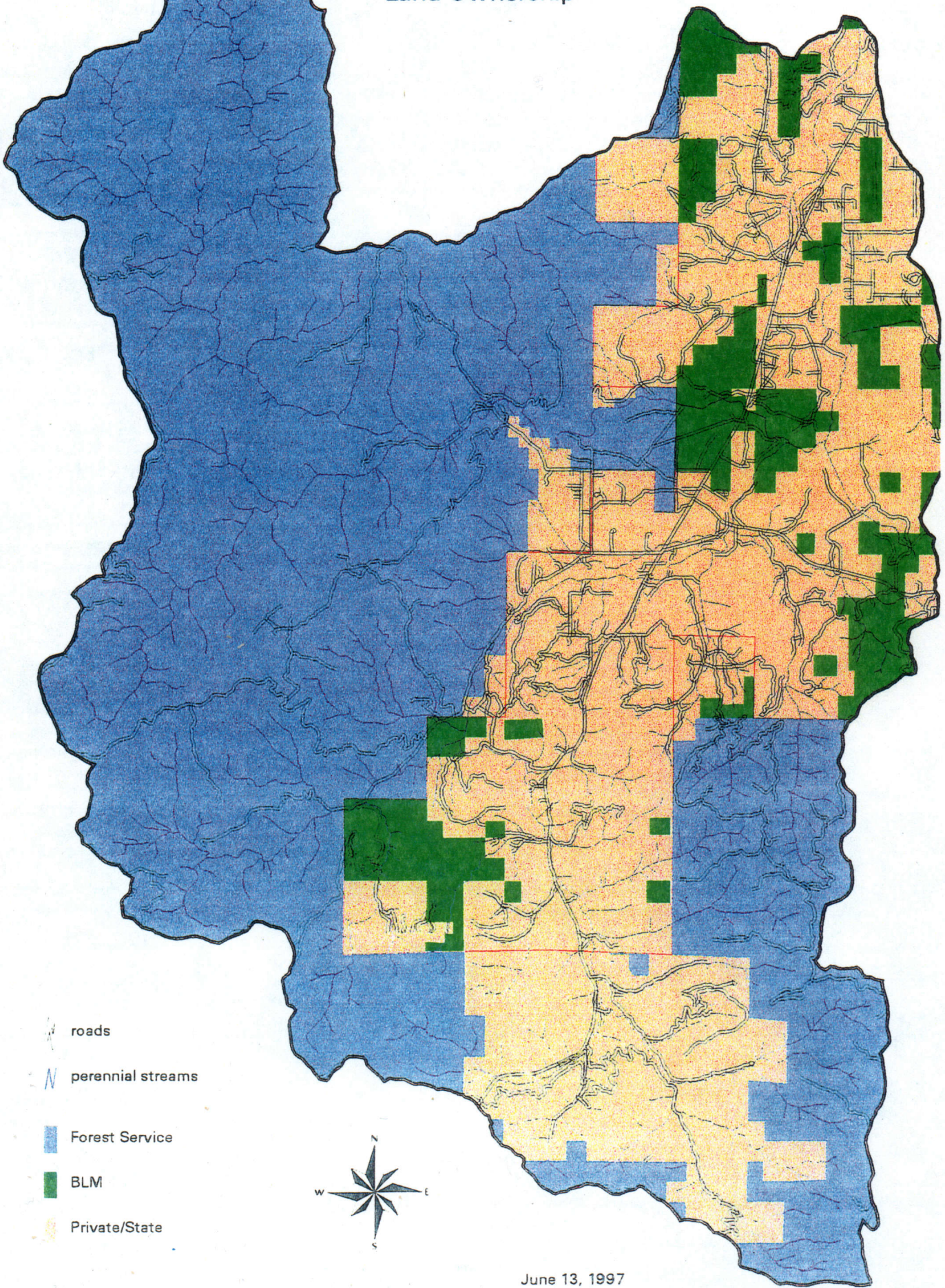
Basin Overview

Ownership and Land Use Pattern

The headwater drainages of the West Fork watershed are generally managed by the Forest Service, while the lower reaches are a mix of federal, state, and predominantly private ownership. One exception is Rough and Ready Creek, which is federally managed from its headwaters to its confluence with the West Fork, with few private inholdings. The western third of the watershed is part of a Rare II Roadless Area (the South Kalmiopsis - map in analysis file). The floodplain of the lower West Fork has been developed, with residences, RV parks and other tourist-oriented establishments between the highway and the river. The flat alluvial deposits between Rough and Ready Creek and the river are the focus of industrial development for the Illinois Valley (airport and mill). The following table shows the mix of land ownership in the watershed. Map 1 shows the ownership pattern.

OWNERSHIP	ACREAGE	PERCENT OF WATERSHED
NATIONAL FOREST	**43,500**	**56%**
BUREAU OF LAND MANAGEMENT	**6,000**	**8%**
PRIVATE OWNERSHIP within Forest Service boundary	**7,500**	**10%**
PRIVATE OWNERSHIP outside Forest Service boundary (includes State and County lands)	**20,000**	**26%**
TOTAL ACREAGE West Fork Watershed	**77,000**	**--**

West Fork Illinois River Watershed
Land Ownership



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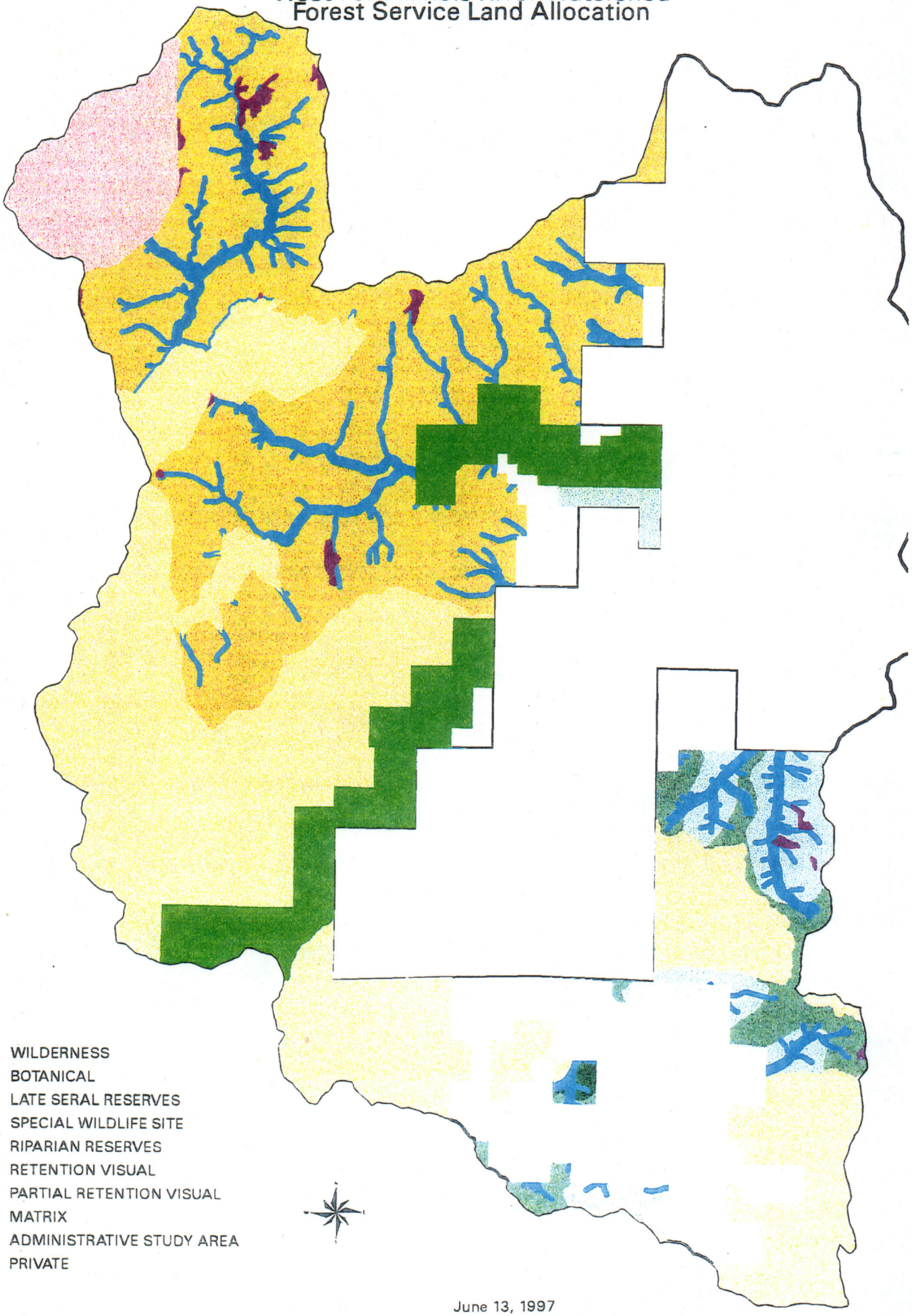
Land Allocations and Objectives

Map 2 shows the pattern of Forest Service land allocations in the watershed. The allocations shown are considered the most restrictive; some lands have multiple allocations and objectives. For instance, Wilderness, MA 4, and Late-Successional Reserve lands also have Riparian Reserves. The following chart shows the acreage, percentage, and objective of management allocations in the watershed.

Siskiyou National Forest Plan Land Allocations	Acreage	Percent Forest Service Lands in Watershed	Objective
Wilderness	**2,300**	**5%**	**Headwaters of North Fork Rough and Ready Creek; manage to maintain natural conditions.**
Management Area 4: Rough and Ready and Oregon Mountain Botanical Areas	**4,100**	**9%**	**Manage to "protect, preserve, and enhance the exceptional botanical features," and when mining, "every effort should be made to protect botanical resources, especially sensitive plant species."**
Late-Successional Reserves (LSR)	**17,000**	**39%**	**This land allocation is on the higher elevations. About 70% is in the West IV LSR, and is a mix of serpentine and diorite intrusions. About 30% is in the East IV LSR. Objective is to manage to maintain late-successional conditions.**
Management Area 14 South Kalmiopsis Administrative Study Area	**13,500**	**31%**	**Most of area is unsuitable for timber production due to reforestation difficulty, no programmed timber harvest, allows for research to test feasibility of silvicultural and harvesting practices.**
Perennial Riparian Reserves in MA 4 and 12, 13 and 14	**3,400**	**8%**	**Manage to meet Aquatic Conservation Strategy.**
Matrix - Management Areas 12, 13 and 14	**3,200**	**7%**	**Primarily Wood Creek; manage for timber and dispersal habitat.**

West Fork Illinois River Watershed
Forest Service Land Allocation



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The Late-Successional Reserves within the watershed are in both the East IV and West IV LSRs described in the LSR Assessment (USDA 1995). The West IV LSR contains about 6% lands that are capable of providing habitat for species that require late-successional habitat.

Bureau of Land Management Allocations

All BLM lands in the watershed are matrix, except for three "Areas of Critical Environmental Concern (ACEC - Rough and Ready, French Flat and Woodcock Bog). The ACECs and most of the matrix lands have a "botanical emphasis".

About 23% of the federal lands in the watershed are in a land allocation that emphasizes protection of its botanical diversity. The following table describes the botanical land allocations within the West Fork watershed along with issues, planning needs, and planned projects within the allocation.

Botanical Area (Ownership)	**Acres**	**Description**	**Issues**	**Planning Needs/ Projects**
French Flat ACEC (BLM)	656 (10-15% within the WA)	Array of valley bottom plant communities including rare native grass-wetland community and low serpentine ridges. Five special status plants including *Lomatium cookii* (State listed and Federal candidate)	Serious OHV damage to hydrology, soil profile and vegetation. Proposed mining, exotic species introduction, and susceptible to intense fire.	Management plan needed for BLM site. TNC has site plan; proposed buying adjacent land parcel needing protection.
Illinois Valley Botanical Emphasis Area (BLM)	10,613	High density of special status plants.	Actions will be allowed only if they do not conflict with the habitat needs of special status plants.	Surveys and analysis when projects are proposed.
Oregon Mountain Botanical Area (FS)	2,623	Concentration of unusal and rare plants. Botanical area is band of serpentine encompassing the west side of the WFk Illinois River to the Oregon/California border.	Potential off highway vehicle damage. Potential for mining. Noxious weed nearby.	Needs management plan.

Botanical Area (Ownership)	Acres	Description	Issues	Planning Needs/ Projects
Rough & Ready ACEC (BLM)	1,164	Mostly alluvial habitat containing many serpentine endemics and rare species, including Lomatium cookii. Also bottomland mixed conifer and woodland, bottomland knobcone pine community not protected elsewhere.	Potential off highway vehicle damage. Potential for mining. Gravel mining.	Management plan in progress. Joint interpretive trail proposed with State.
Rough & Ready Botanical Area (FS)	1,499	A variety of serpentine habitats including alluvial river flats, rock outcrops and steep hillsides.	Potential off road vehicle damage. Proposed use and reconstruction of roads for mining. Noxious weed.	Needs management plan.
Rough & Ready State Botanical Wayside (State)	11	Established in 1938, this area is a focus of regional, national and international visitors. The alluvial terrace provides habitat for species not found up slope.	Off highway vehicle damage. Illegal dumping of trash. Airport expansion. Noxious weed (yellow star thistle along roadside).	Road closure. Joint interpretive trail with BLM
Woodcock Bog ACEC (BLM)	280	Darlingtonia wetland on serpentine and special status plants	Illegal past water diversion. Mendenhall fire suppression activities impacted some rare plants.	Needs management plan.

Other Objectives of Interest

Oregon State has some parcels of land within the watershed, including three state parks: the Forks, Rough and Ready Botanical Wayside, and the Gateway Wayside near Oregon Mountain.

Watershed Transportation System
Low-standard roads cross the western portion of the watershed, including within the Rare II area. These roads access mining claims. Map1shows the transportation system across the watershed. Most of the low-standard roads are considered Level II by Forest Service engineers, which means they are maintained for high-clearance vehicles (current funding does not allow for maintenance on all Level II roads, not all are drivable). Maps of BLM roads are in the analysis file.

Physical Environment

Physiography and Climate
The West Fork of the Illinois River joins the East Fork near Cave Junction at an elevation of 1280 feet. Rough and Ready Creek watershed has its highest elevation at Josephine Mountain at 4764 feet. The highest elevation in the Whiskey Creek watershed is on it's divide with Rough and Ready, at 3925 feet. The highest elevation for the main stem of the West Fork of the Illinois is relatively low, with the divide near 3680 feet (about 1 1/2 miles west of the low pass at Randolph-Collier tunnel on Highway 199). In contrast, Elk Creek Watershed originates in the Siskiyou Mountains at approximately 5280 feet at Little Sanger Peak.

Precipitation varies considerably across the watershed, by elevation and with the mountains providing a rain shadow for the Illinois Valley (Insert Figure Isohyetal map when available). Low ridges in the western part of the watershed capture lots of rain. Precipitation is distributed into pronounced seasons: most precipitation falls between October and June. Scattered thunderstorms in the summer provide locally intense showers. On average, the transient snow zone is located above 2500 feet in elevation, and the longer-lasting seasonal snow remains above 4500 feet.

The following table shows the acreage of the primary drainage areas (subwatersheds) within the West Fork Watershed.

SUBWATERSHEDS	ACREAGE
14E, Elk Creek	17,000
14L, Lower Facing Drainages	13,000
14M, Middle Facing Drainages	15,500
14R, Rough and Ready	23,000
14W, Whiskey Creek, Upper West Fork	8,500
Total West Fork Illinois	77,000

Map 3 identifies the subwatersheds.

Geology, Geomorphology, and Soils

The western portion of the watershed is underlain primarily by ultramafic rocks: peridotite and serpentinized peridotite (see Map 4). Ultramafic rocks contain high levels of iron and magnesium, and other elements such as nickel, chrome, and cobalt.

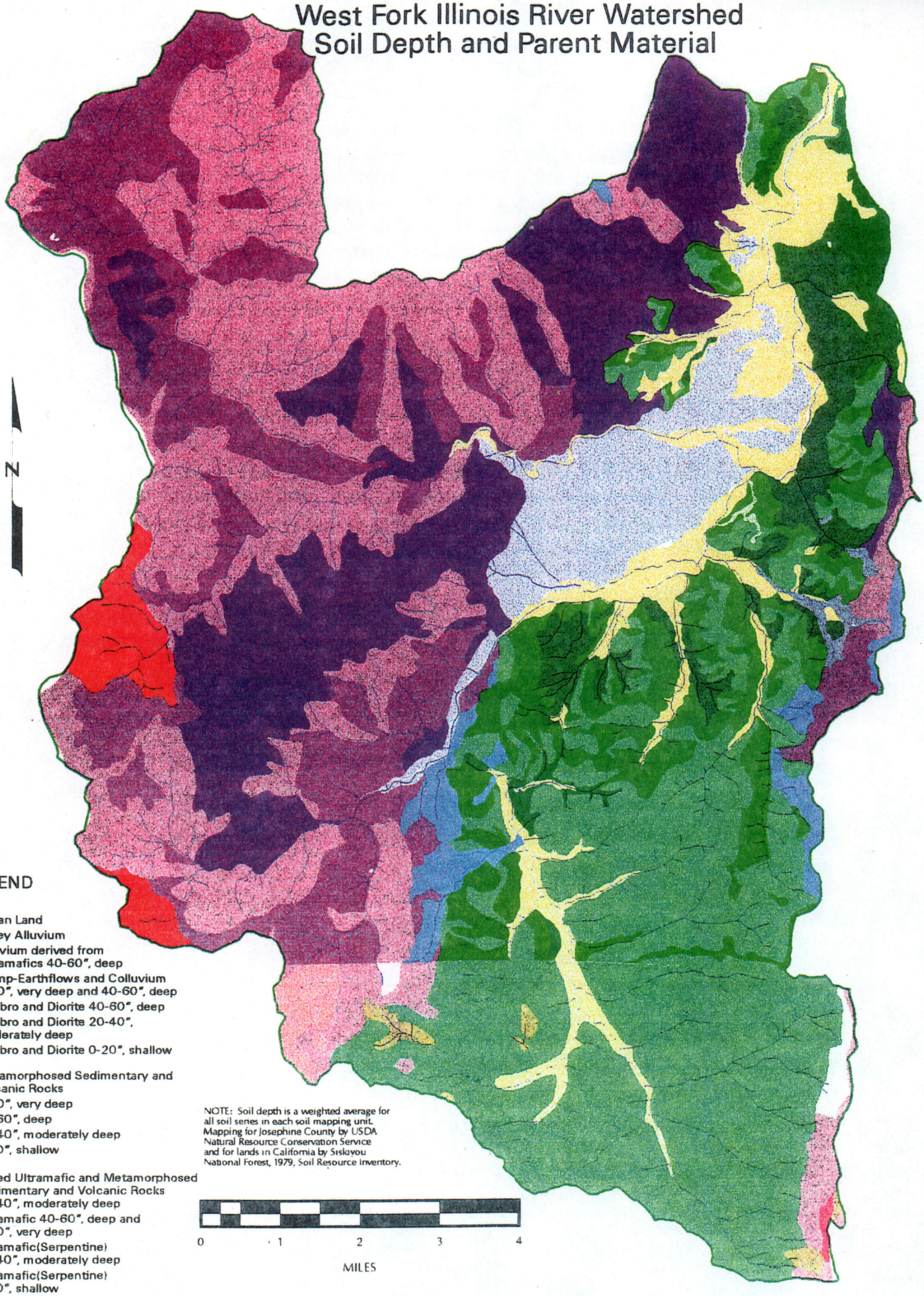
The eastern part of the watershed is primarily underlain by the Galice Formation (common to the east side of the Illinois Valley and Siskiyou Mountains, metasedimentary rock). Quartz diorite and gabbro intrusions are scattered across the watershed. The following chart shows the porportion of serpentine for each subwatershed.

Subwatershed	Acres of Serpentine Within Subwatershed	Subwatershed Acres (Total)	% Subwatershed Serpentine
14E; Elk Creek	1,250	17,000	7%
14L; Lower Facing Drainages	6,100	13,000	46%
14M; Middle Facing Drainages	7,000	15,500	45%
14R; Rough and Ready Creek	21,500	23,000	93%
14W; Whiskey Creek, Upper West Fork	7,300	8,500	87%
TOTAL for West Fork Illinois River	43,275	77,000	56%

A fault separates the Galice Formation from the Josephine Ultramafic Sheet. Earth movement along this fault raised the mountains in the west as a block. The 'Basin and Range' topography that resulted from the movement along the fault is atypical in the Klamath Mountains (more common in southeastern Oregon). One feature of Basin and Range topography is stream channels depositing bedload across a broad fan. The Rough and Ready alluvial fan is a prime example of these processes. The often sparse vegetation on the fan is related to the high percentage of ultramafic materials, with soil development and vegetation varied depending on the time since disturbance by reworking by the channel. Another example of an alluvial fan with coarse deposits is at the mouth of Rock Creek.

Nickel-rich *lateritic* soils have developed on the Josephine Ultramafic Sheet; on the southern, older part of the Rough and Ready Alluvial Fan, on relatively flat ridges of ultramafic rock, and on terrace gravels ranging from 7 to over 40 meters above modern floodplains (Moring, 1983). Laterites are formed under tropical climatic conditions. According to Albers (1966), these conditions most likely existed from post-Miocene to Pleistocene time. The deep weathering of the bedrock is reflected in the mapped soil depths (see Map 4).

ILLINOIS VALLEY RANGER DISTRICT
West Fork Illinois River Watershed
Soil Depth and Parent Material



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Aquatic Environment

Hydrologic Features and Channel Morphology

The West Fork watershed contains 296 miles of perennial waterways. The shallow, rocky soils on most parts of the Josephine Ultramafic Sheet have little capacity for water storage, leading to high runoff to rainfall ratios. High runoff causes the stream to be "flashy", with a rapid channel rise in response to rainfall, and a rapid fall when the storm has passed. High runoff leaves less water for the summer low flow season when stream water temperatures are critical. Fractures and shear zones within the bedrock may store water and release it as perennial springs, contributing locally to summer flow and supporting fens.

Meandering and braided channels are evident all across the Rough and Ready alluvial fan. Loss of surface flow from the channel becomes evident during the low flow season, and indicates a "losing" or "effluent" channel recharging groundwater to the aquifer.

Water is diverted for agricultural and industrial use throughout the watershed. On Rough and Ready Creek, five diversions supply residents and the mill. Effects of the diversions on the hydrologic system are unknown.

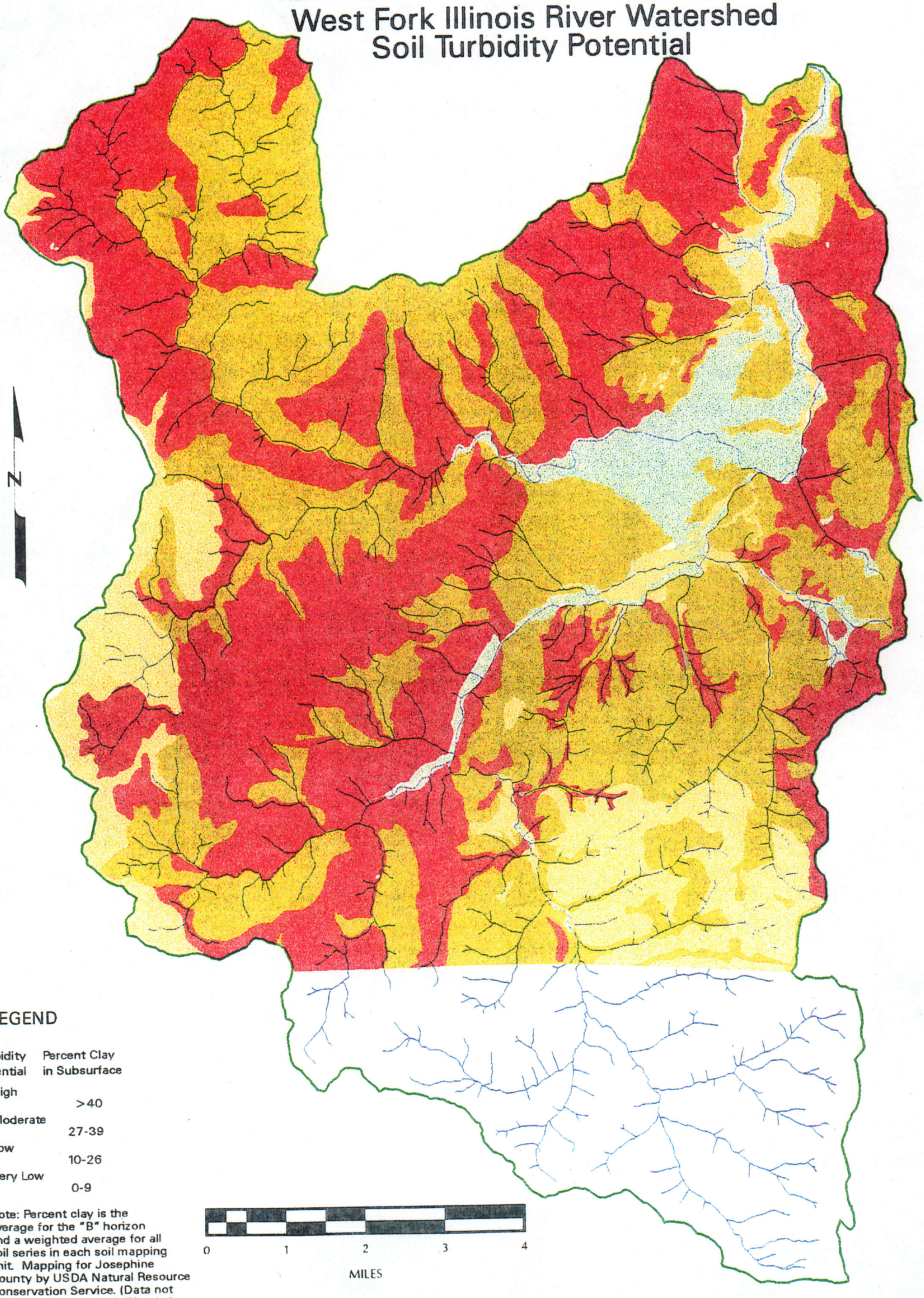
The Elk Creek channel has a relatively low stream gradient and wide valley floor that extends unusually high up toward the headwaters, compared with other streams in the upper Illinois River Sub-basin. On the valley floor, Highway 199 confines the channel flow at bridges, inhibiting side channel development. At high floor, stream energy is concentrated, rather than dispersed across the flood plain.

Water Quality

The West Fork Illinois River and its major tributaries have been designated *water quality limited* by the Oregon Departmen of Environmental Quality, because summer water temperatures exceed 68 degrees F (more information on water temperature is in the analysis file). Water diversion at low flow may affect water temperatures.

The abundance of shallow, rocky soils and rock outcrops, and the lack of disturbance on the serpentine lands in the watershed contribute to exceptional water clarity. Water in the non-serpentine streams tends to be more turbid during high flows. For instance, Rilling and others (1996) conducted synoptic sampling of turbidity in several locations in the watershed and found moderately high levels of turbidity in Elk Creek and Wood Creek (71 and 100 NTUs respectively) and low levels in Rough and Ready (12 NTUs). However, if disturbed, serpentine soils may contribute fines. Much of the serpentine weathers to clay. Map 5 shows the turbidity potential based on soil depth and clay content.

ILLINOIS VALLEY RANGER DISTRICT
West Fork Illinois River Watershed
Soil Turbidity Potential



Note: Percent clay is the average for the "B" horizon and a weighted average for all soil series in each soil mapping unit. Mapping for Josephine County by USDA Natural Resource Conservation Service. (Data not available for lands in California.)

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Anadromous Fishery

Illinois River anadramous fisheries are the stronghold for wild anadromous fish repopulation in the Rogue Basin. Factors affecting inland poplulations are water temperature, sediment, water quantity, and habitat complexity (large wood and pools). The West Fork by acreage makes up 20% of the Illinois River Subbasin. There are approximately 77 miles of streams that support resident or anadromous fish.

Stream Class	***Miles***
Fish Bearing Streams on Forest Service	77
Non-fish Bearing Streams on Forest Service	153
Other Ownerships (primarily BLM and PVT)	65

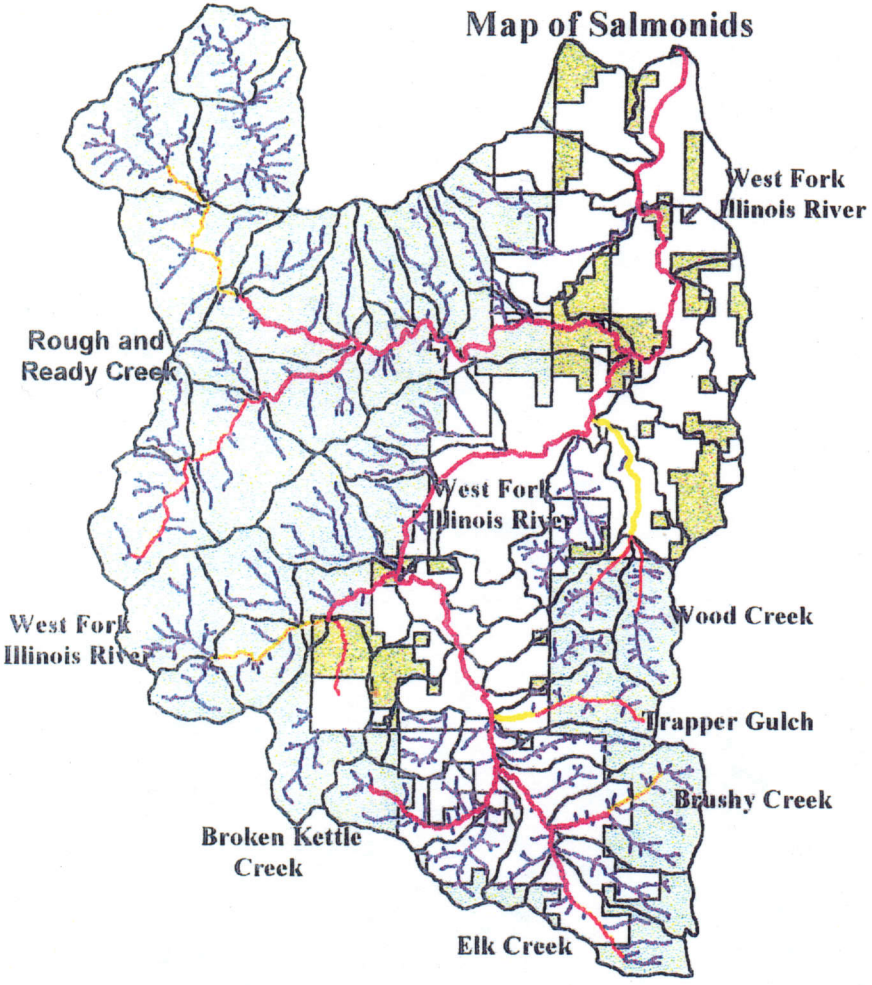
The West Fork watershed produces an estimated 10% of the coho in the Illinios River Subbasin (about one-third of the population produced in Sucker Creek - Frick, personal communication, 1997). Elk Creek produces most of these coho. The serpentine portion of the watershed is thought to be of less importance to coho production. For comparison, contrast the "percent pools", which is about 16% on Rough and Ready Creek, and 62% on Elk Creek (35% or more is considered good). The majority of wild coho and steelhead in the entire Rogue River Basin spawn in the Upper Illinois.

Other conditions, such as high water temperature, low summer flows, and lack of large wood limit salmonid production. Two water diversions on Rough and Ready Creek, Seats Dam and the Wings and Ferron Ditch, may be considered migration barriers to juvenile salmonids during low flows. Isolated populations of cutthroat trout may exist in the serpentine and may be worthy of further study.

The following chart compares current fish habitat condition ratings[3] for streams of similar gradients that flow through serpentine and non-serpentine to optimum (reference) conditions. Stream survey data for fish-bearing reaches of Rough and Ready (primarily serpentine) and Elk, Broken Kettle, and Brushy Creeks (primarily non-serpentine). Map 6 shows fish distribution on the West Fork.

[3]Ratings are based on Oregon Department of Fish and Wildlife benchmarks and the Klamath Mountain Matrix of Indicators available in the analysis file.

West Fork Illinois River
Map of Salmonids



Wfwab
Watblanc.shp
Wffish

Fall Chinook & All Salmonids
Wffish

Coho Salmon & Steelhead & Trout
Wfflsh

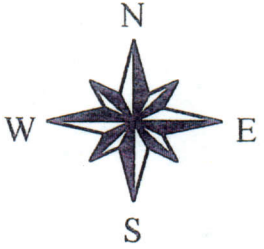
Winter Steelhead & Trout
Fd2ea

Cutthroat Trout
Fd2ea

Rainbow Trout
Wfst

Perennial Streams

Wfowns
BLM
FS
Private Lands



	Habitat Variables		
	Channel Width/Pool	**Percent Pools**	**Large Wood**
Low Gradient (less than 2 percent)			
Serpentine	***Good***	***Fair***	***Poor***
Non-Serpentine	***Good***	***Excellent***	***Poor***
Moderate Gradient (between 2 and 5 percent)			
Serpentine	***Marginal***	***Marginal***	***Marginal to Poor***
Non-Serpentine	***Good***	***Good***	***Poor to Good***
High Gradient (greater than 5 percent)			
Serpentine	***Poor***	***Very Poor***	***Very Poor***
Non-Serpentine	***Good***	***Fair***	***Good***

Riparian Environment

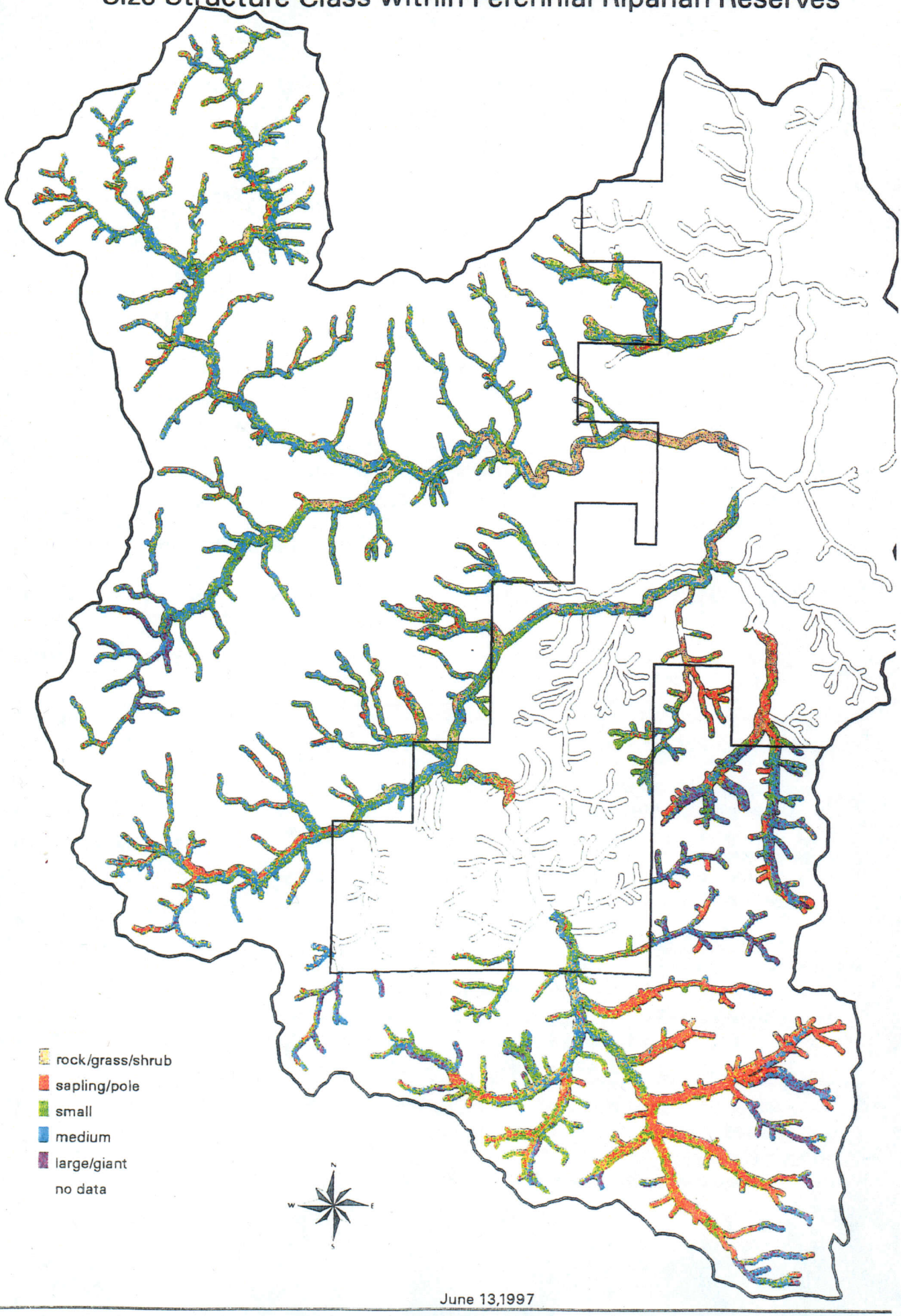
The West Fork watershed contains 296 miles of perennial waterways. Riparian habitat varies along these streams: in smaller to mid-size streams on serpentine, the streamside zone is very narrow (10 to 30 feet from the waterway); on larger waterways, the riparian zone extends hundreds of feet. Of particular interest is the large alluvial fan created by Rough and Ready Creek as it enters the valley floor. This alluvial fan may be associated with an extensive hyporheic (intergravel) zone. Hyporheic zones may support unique and/or diverse invertebrate populations. The Obrien Caddisfly, a Forest Service Region Six sensitive species, was first described in the West Fork watershed. The species has not been identified since. Invertebrate inventory has not revealed this, or other rare species (more information in the Fisheries Report).

Riparian Reserves were mapped for perennial streams on Forest Service (see map 7). The condition of these reserves varies between the size of the stream, parent material, and other habitat indicators. The following chart shows the percentage of size-structure classes within perennial Riparian Reserves on Forest Service in the watershed[4]. This data is based on satellite imagery and must be interpreted for serpentine; the sapling/pole and small conifer classes are likely older than those same classes on non-serpentine habitats.

The shrub type is most common on smaller tributaries. The distribution of conifer types is relatively constant across various sizes of tributaries. Detailed data about the riparian condition of

[4]Map unit stratification details are available.

West Fork Illinois River Watershed
Size Structure Class within Perennial Riparian Reserves



June 13,1997

each subwatershed, displayed by stream class and canopy coverage, is in the analysis file (physical setting and wildlife reports).

Size-Structure Class	Percent of Perennial Riparian Reserves on Forest Service
Shrub	**8%**
Sapling/Pole	**43%**
Small	**23%**
Medium	**18%**
Large/Giant	**7%**

The small percentage of the large and giant tree size-structure classes is related to the high proportion of serpentine, removal of the largest trees, and fire history. Serpentine areas do not inherently support species that require late-successional habitat, even within riparian areas. Under reference (historic, natural) conditions, 22% of the riparian reserves would be predicted to be in the large or giant class (more about reference conditions in the specialist reports appended to this summary). This data indicates that logging has reduced about two-thirds of the largest trees within riparian areas. The Longwood (1987) and Mendenhall (1994) Fires affected the southeastern and northwestern fringes of the watershed.

The following chart compares and contrasts riparian area character and function within serpentine and non-serpentine habitats.

CHARACTERISTICS OF RIPARIAN HABITAT AND ITS FUNCTION Serpentine as Compared to Other Late-Successional Habitat Types		
	SERPENTINE HABITAT	**OTHER HABITAT TYPES**
Stream Morphology/ Substrate	High energy system with cobble substrate, rock weathers directly to silt and clay leaving a lack of sands and gravel.	Deep V-Shaped drainages at the headwaters, with alluviated canyons in lower reaches.
Riparian Zone	Riparian zone very narrow. Riparian vegetation sometimes limited to plants with roots in the creek, rarely extends further than 20 feet from the active channel.	Riparian zones tend to be wider, especially along larger perennial streams.
Late-Successional Conditions	May not be capable of providing high quality late-successional habitat (e.g. for species such as spotted owl).	Is capable of providing high quality late-successional habitat.

CHARACTERISTICS OF RIPARIAN HABITAT AND ITS FUNCTION Serpentine as Compared to Other Late-Successional Habitat Types		
	SERPENTINE HABITAT	**OTHER HABITAT TYPES**
Shade-Producing Vegetation	Trees are larger in narrow riparian zones than surrounding vegetation, but rarely exeed 36" dbh. Stand density generally not capable of exceeding 70% canopy cover; often less than 40%. Port-Orford-cedar is primary source of shade.	Large trees grow in wider zones. Stand density capable of exceeding 70% canopy cover. Multiple species of shade-producing vegetation.
Role of Port-Orford-cedar	Port-Orford-cedar is primary riparian component and most significant source of large wood. Creates riparian micro-climate, provides bank stability. Port-Orford-cedar may make calcium available to other plants as needles drop.	Smaller proportion of Port-Orford-cedar. Long lasting source of large wood (other species also provide large wood).
Large Wood	Riparian zones not capable of providing ready source of large wood to stream system. Large wood delivered to streams quickly flushed through system.	Riparian zones capable of providing ready source of large wood to stream system. Large wood in streams can lodge in lower reaches.
Intermittent Streams	High proportion of landbase consisting of intermittent Riparian Reserves. Intermittent streams flow during a shorter period of the year. Vegetation alongside intermittent channels varies little from upland conditions.	Proportion of landbase consisting of intermittent Riparian Reserves variable. Intermittent streams flow for longer period of the year. Riparian vegetation is sometimes distinct from upland condtions.
Perennial Springs and Seeps	Water emerges from bedrock shear zones on slopes.	Water emerges within swales and channels.
Rare Plant Species	Many rare species are related to riparian habitats, including fens, vernal pools, and seeps.	Fewer rare plants.
Response to Disturbance	Revegetation following disturbance slow to become established. Gullies are long lasting.	Exposed sites tend to revegetate more quickly.

Port-Orford-cedar and Root Disease

Port-Orford-cedar (POC) is distributed mainly along riparian areas throughout the watershed. Two factors are primarily responsible for the distribution pattern: summer water availability, and fire (Zobel, et al 1985). Summer water availability is related to many factors, including soil moisture, topography, geology (POC is concentrated on serpentine) and microclimate. POC is limited to microsites that assure a consistent water supply, such as areas with moving subsurface

or surface water, slumped topography with seepage, soils with clay development, and slopes with sufficient watershed above to maintain seepage. POC is often limited to stream valleys, lower slopes or to northerly slopes where late summer water potentials are highest. Fire also has a major influence on the distribution of POC. Historic frequent fire return intervals may have eliminated POC from drier sites. POC is more susceptible to fire than associated conifers in the seedling and sapling stages and early growth is slow. This may not have allowed POC to become sucessfully established where fires were frequent or more severe.

POC reproduction is apparently becoming established away from more typical wetter riparian sites. This is likely a result of long "fire free intervals" resulting from fire exclusion. Whether sufficient summer moisture will be available on these sites to allow these trees to continue to survive and grow is unknown.

POC has been mapped in the West Fork watershed using aerial photos, aerial flights, and ground verification (see Map 8). Other areas, especially on private land, may also support POC. The maps show that POC is more widely distributed on serpentine and toward the more coastal influenced western portion of the watershed. In Elk Creek, Woods Creek and other tributaries on the east side of the watershed, POC becomes less widely distributed and more commonly associated with riparian areas. The density of POC is generally low in the watershed (<5% canopy closure) except for narrow riparian corridors along the stream courses.

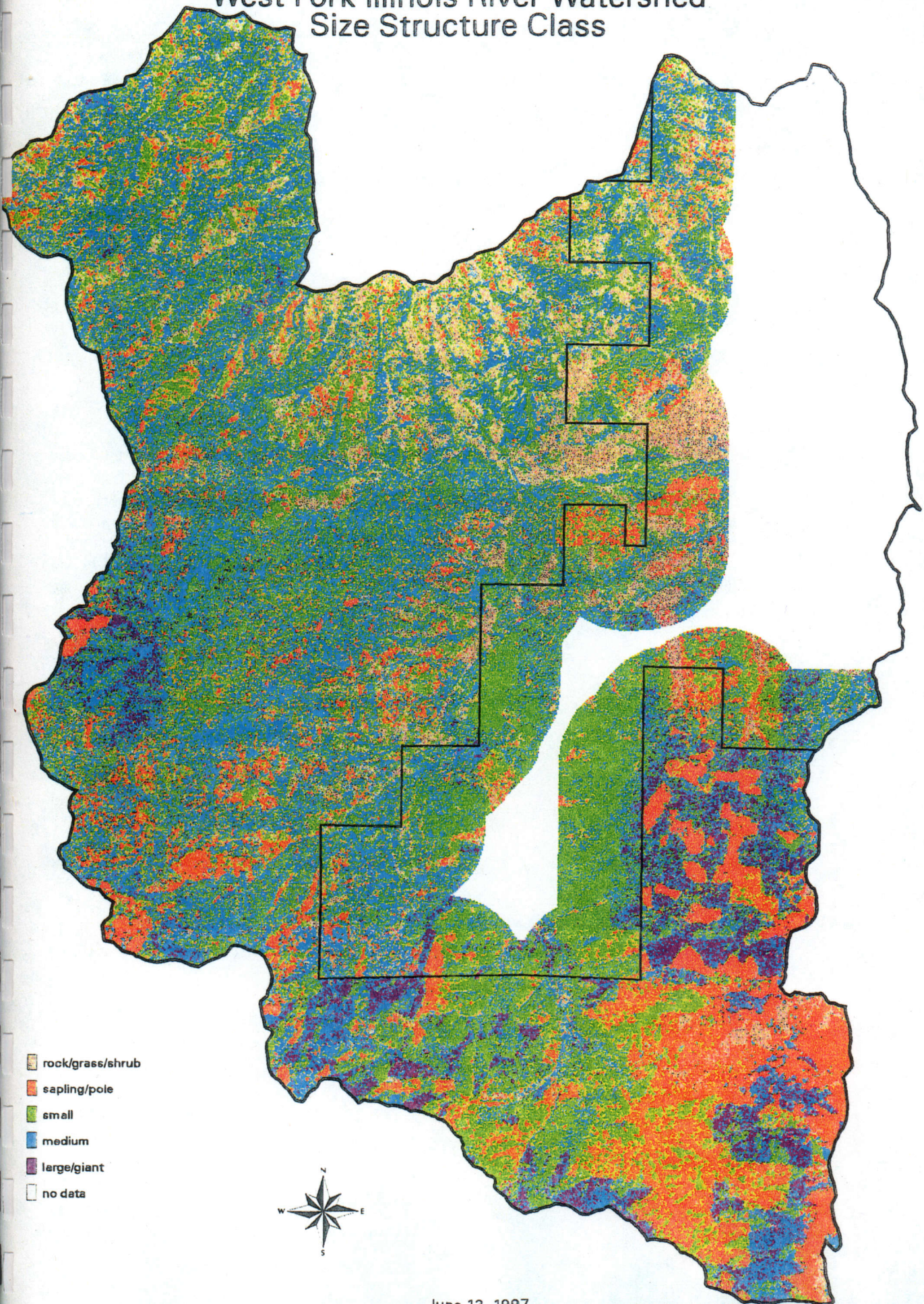
Map 8 also documents known POC root disease (*Phytophthora lateralis*) infestations in the watershed. Once introduced into a streamcourse, POC root disease eventually kills most POC downstream, within about 20 feet of the high water line. Mortality occurs over a period of years and is slowest where POC occurrence is scattered. POC on dry microsites with no standing water or overland flow are not significantly impacted by the disease.

With the exception of Rough and Ready Creek, most of the low elevation main drainages are infested. Areas downstream from known infestations are likely also infested. The highest point in the watershed that POC root disease has been detected is an infestation originating at a rock pit on Oregon Mountain. The infestation has spread down Whiskey Creek. It was not identified in an aerial survey in 1992. Shelly, Diamond and Knopti Creeks (all tributary to the Smith River) are adjacent to the watershed and are currently infested. Baldface Creek (tributary to the Smith River) is currently uninfested as is the upper Chetco River in the Kalmiopsis Wilderness. The lower East Fork of the Illinois River is also infested.

POC is the primary shade-tolerant conifer along many streams in the West Fork. It is long lived, can achieve large diameters on the best sites, and is a source of long lasting snags and large woody material. Loss of POC in these areas would result in replacement by less shade-tolerant conifers and hardwoods. Replacement by other species would be particularly slow or non-existent on less productive serpentine soils.

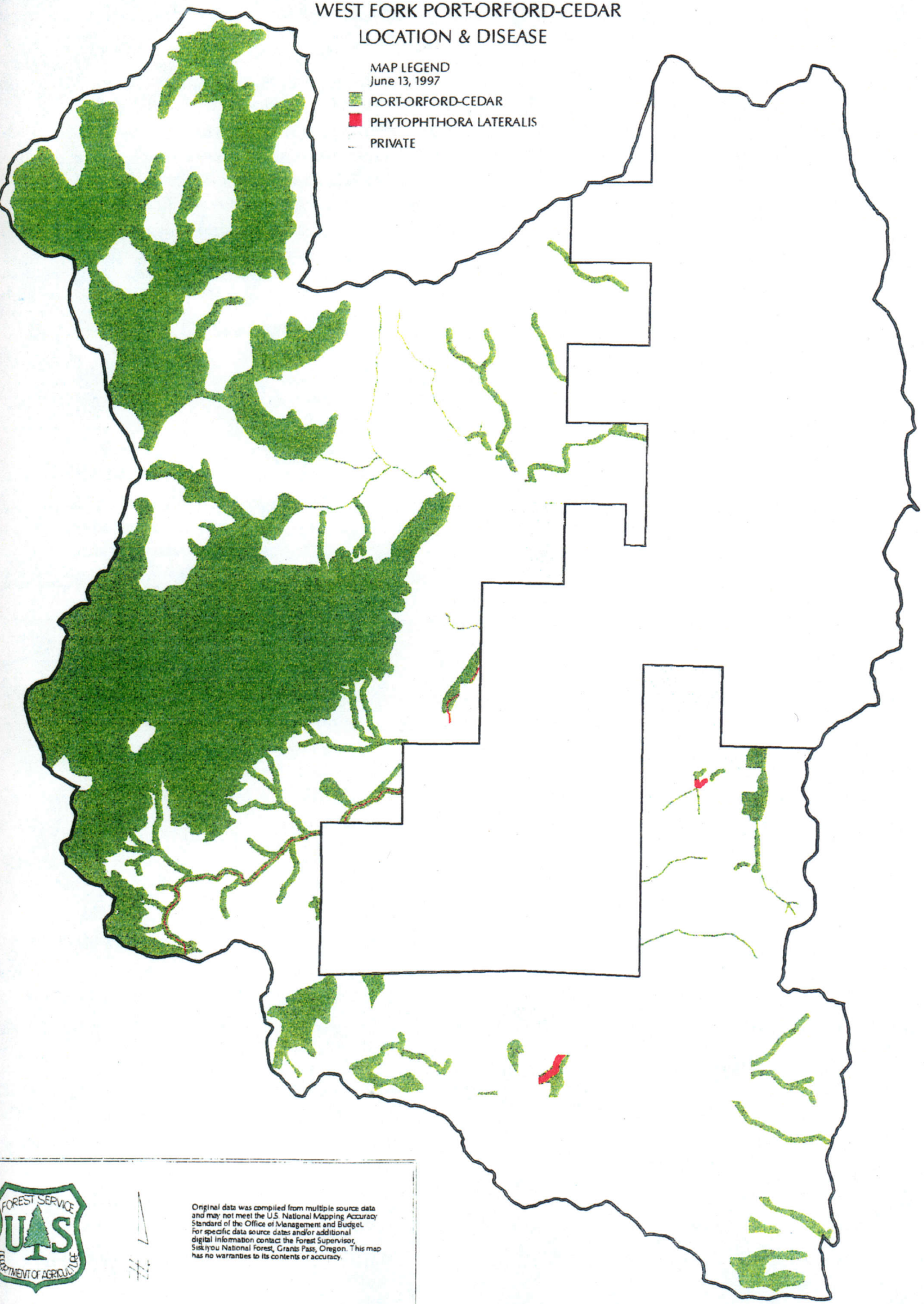
Infection with root disease is highly dependent on the presence of free water in the vicinity of POC roots. High risk areas for infection are stream courses, drainages, or low lying areas downslope from already infected areas, or areas below roads and trails where inoculum is introduced.

West Fork Illinois River Watershed
Size Structure Class



June 13, 1997

ILLINOIS VALLEY RANGER DISTRICT
WEST FORK PORT-ORFORD-CEDAR
LOCATION & DISEASE



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DEPARTMENT OF AGRICULTURE

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. For specific data source dates and/or additional digital information contact the Forest Supervisor, Siskiyou National Forest, Grants Pass, Oregon. This map has no warranties to its contents or accuracy.

The greatest potential for loss of POC from root disease in the West Fork would be from introductions into the headwaters of largely uninfested stream courses. Many adjacent drainages and the lower elevations of the West Fork are already infested. The existing road system (Wimer, Sourdough, and Bearcamp Roads) as well as the McGrew Trail access portions of the watershed through infested areas. Prevention of import of the disease into Rough and Ready Creek subwatershed is particularly important.

Tactics used to prevent the spread of the disease involve limiting the movement of contaminated soil and water, and removing susceptible host roots from high risk areas. Permanent road closures are likely to be the most effective treatment in uninfected areas. In the many areas where closures cannot be used, other exclusion techniques including sanitation, temporary road closures, vehicle cleanliness, and management of POC on microsites with characteristics unfavorable for root disease should give best results (Don Goheen, letter of 1/26/96). Specific recommendations for limiting the spread of the disease in this watershed are in the Recommendations portion of the summary, and in the specialist reports appended to this document.

Terrestrial Environment

Distribution of Size-Structural Classes (Seral Stage)

Maps 9 and10 display the pattern of size-structure classes and canopy cover groups across the watershed. The following chart integrates these layers, and shows the percentage of the watershed in terms of size-structure classes and canopy closure groups. This data is based on satellite imagery, and covers Forest Service (FS) lands and other lands within one mile of the FS boundary (approximately 56,000 acres). The largest trees and heaviest canopies are in the non-serpentine portion of the watershed.[5] Some information is available on BLM lands outside this area (see below). The remaining 20,000 to 25,000 acres is primarily lands that have been converted through urban development, agriculture, or are heavily logged-over.

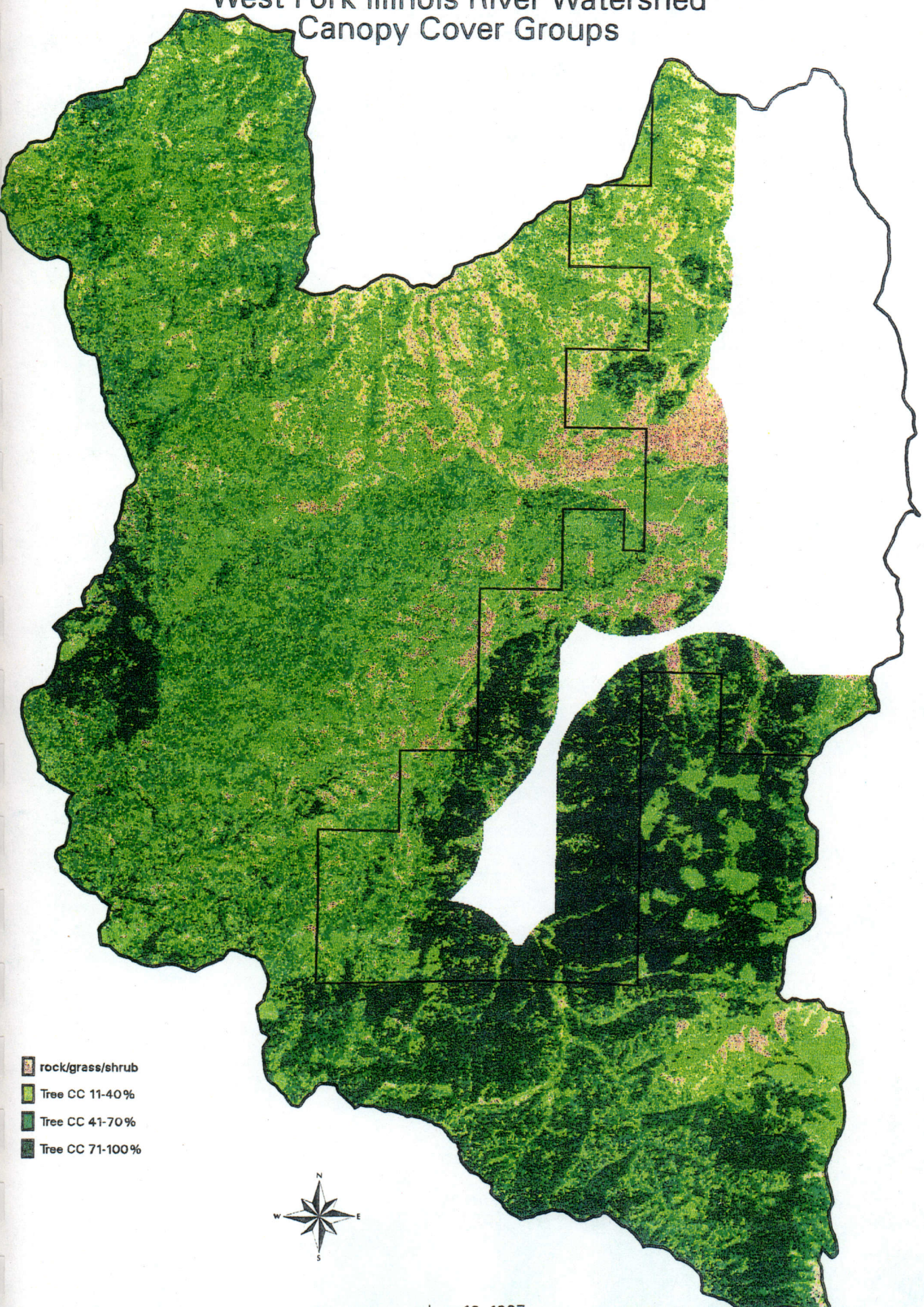
This data is based on satellite imagery and must be interpreted for serpentine; the sapling/pole and small conifer classes are likely older than those same classes on non-serpentine habitats. Within the non-serpentine portion of the watershed, under reference (historic, natural) conditions, 23 percent of the watershed would be predicted to be in the large or giant class. This data would indicate that logging has removed most of the largest trees within the watershed.

However, the amount of medium-sized forest has increased (from 11 to 19 percent of the watershed). The density of live and dead vegetation has increased from reference conditions. The structure of the medium-sized forest stands in the watershed is more conducive to catastrophic fire than historic.

The two recent wildfires (Longwood in 1987 burned about 2300 waters acres and Mendenhall in 1994 burned about 450 acres) exemplify extreme fire behavior and stand replacement due to increases in fire-spreading fuels. Five other wildfire, ranging in size to between 6 and 721 acres were recorded in the watershed between 1944 and 1960.

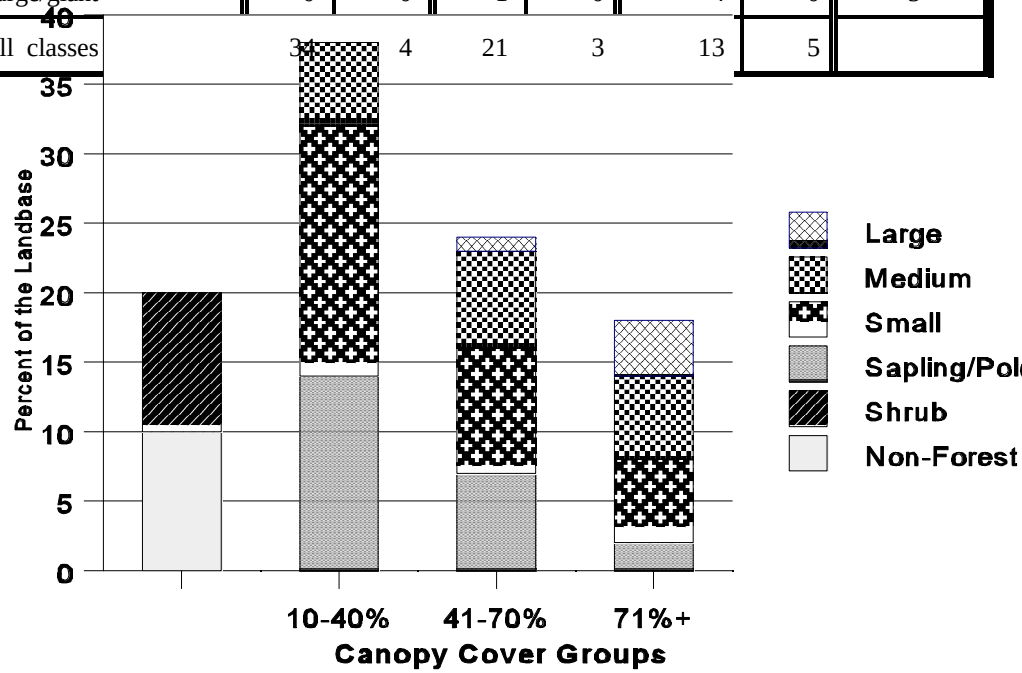
[5]Map unit stratification details are available.

West Fork Illinois River Watershed
Canopy Cover Groups



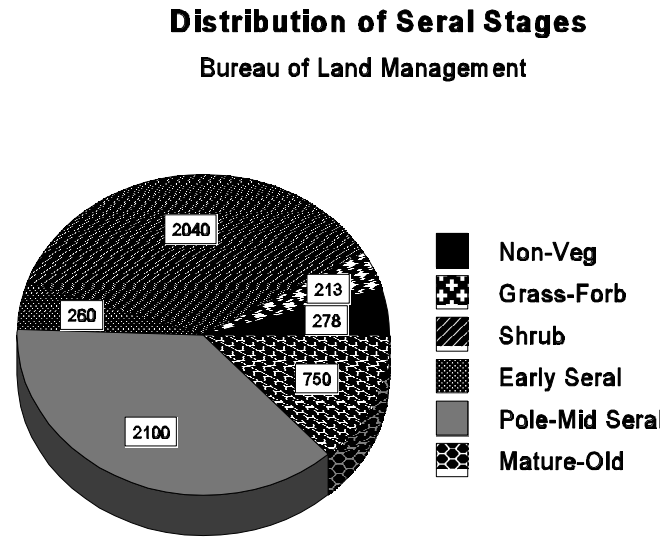
Additionally, most of the interior forest habitat has been removed. A few small patches of interior forest remain in Elk, Trapper, and Wood Creeks. Large patches of interior forest, up to 1200 acres in size, once existed in these drainages. More information about reference conditions in the specialist reports appended to this summary.

SIZE/STRUCTURE CLASS	PERCENTAGE BY CANOPY CLOSURE GROUP						
	10-40 pct Canopy		41-70 pct Canopy		71+ pct Canopy		all groups
	FS	other	FS	other	FS	other	total
non-forest (grass, rock)	n/a						10
shrub	n/a						10
sapling/pole	11	3	5	2	1	1	23
small conifer	17	1	8	1	3	3	33
medium conifer	6	0	7	0	5	1	19
large/giant	0	0	1	0	4	0	5
all classes	34	4	21	3	13	5	



The following chart shows the distribution of seral stages on Bureau of Land Management (BLM) lands. Note that the BLM classifies its data differently than the Forest Service, therefore direct comparisons are not possible. A map showing the pattern of these vegetation classes is in the analysis file.

Bureau of Land Management Vegetation Class	Acres
Non-Vegetated	278
Grass-Forb	213
Shrub	2,040
Early	185
Seedling	77
Pole	80
Mid	2,013
Mature	756
Total Acres	5,642



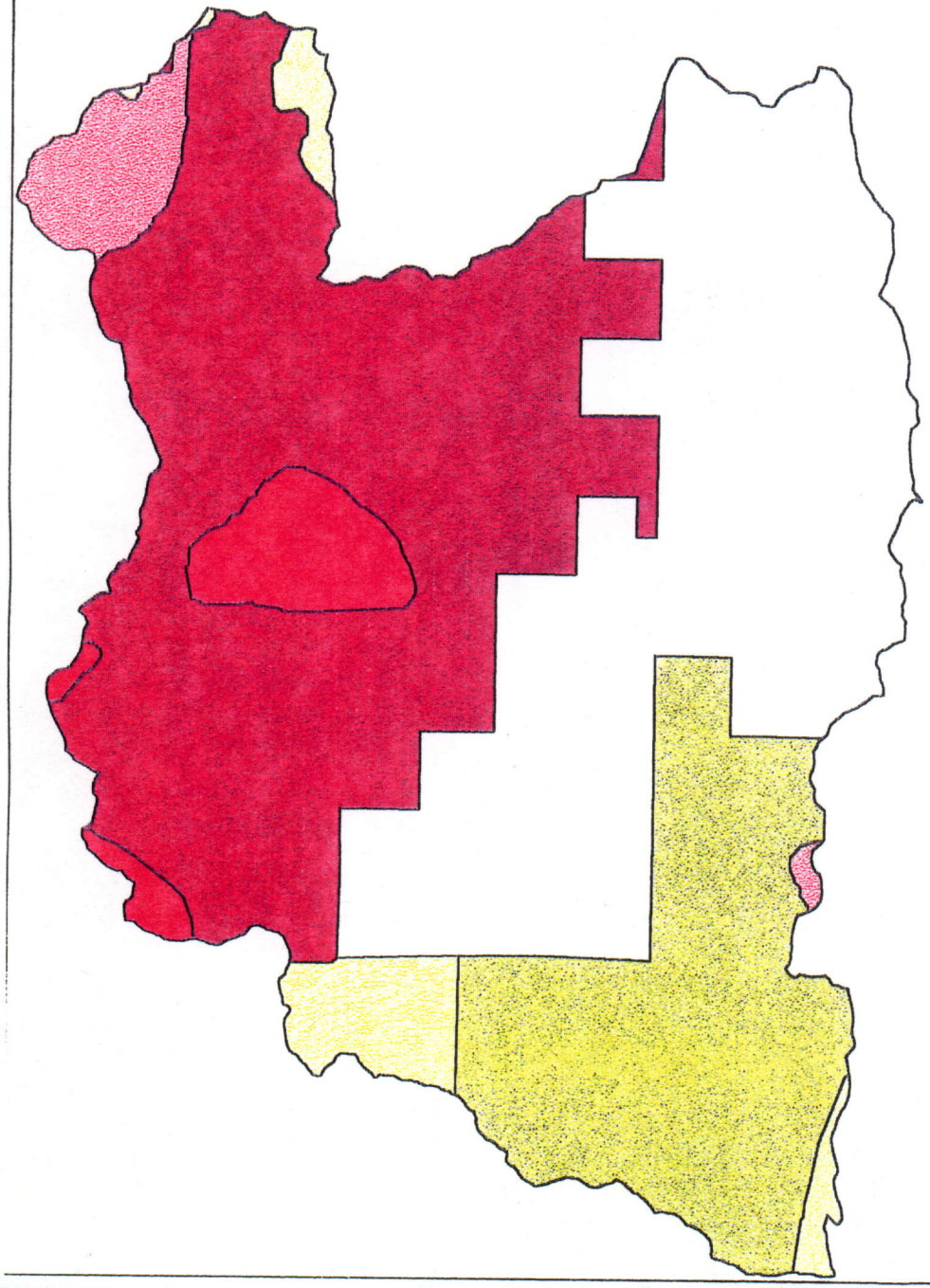
Plant Series'

Map 10 shows the distribution of plant series' mapped across the watershed. Serpentine vegetation is very diverse, and has not been precisely mapped. Note that a large portion of the watershed is mapped as a mix tanoak, douglas-fir, Jeffrey pine and white pine series.' These series' represent a wide variety of vegetation types. Further description of plant associations on serpentine and non-serpentine habitats is in the Guide to the Forested Plant Associations of Southwestern Oregon (USDA 1996) and other plant classification guides.

Botanical Diversity

The Klamath-Siskiyou region has long been noted for its plant diversity and complex vegetation patterns. This region has been identified as one of eight centers of plant diversity and endemism in North America (Davis et al 1997). The West Fork watershed epitomizes this diversity and has been ranked #1 of 1,400 watersheds in Oregon for the numbers of rare plant species growing in the watershed. Hybrid swarms of manzanita and deer brush have been documented in the watershed; hybridazation is considered an evolutionary process toward the development of new species.

A complete plant inventory has not been prepared for this watershed. A preliminary plant list, documenting some 278 species, has been published for the Rough and Ready subwatershed (Borgias 1994). An additional 24 species have been identified in the subwatershed since 1994.



Wfveg

- ABCO= White Fir
- CHLA= Port Orford Cedar
- LIDE3= Tanoak
- LIDE3_PSME= Tanoak and Douglas Fir
- LIDE3_PSME_PIJE_WP= Tanoak, Douglas Fir, Jeffrey Pine, White Pine
- PIJE= Jeffrey Pine
- PSME= Douglas Fir
- Wfwam

Much of the West Fork watershed has not been surveyed. Approximately 45 rare species of plants have been documented in the watershed. Of these, most (75%) are on serpentine. Nine species of rare plants have a significant portion of their range in the watershed. The following table discusses the status of these nine species.

Scientific Name (Common Name)	**Total Known # of Occurrences (acres) Worldwide 4/17/97**	**# of Occurrences (acres) w/i W. Fork Illinois WA**	**% of Occurrences (acres) w/i W. Fork Illinois WA**	**Important Considerations (including important placement w/i range and genetic variability)**
Epilobium oreganum * (Oregon willow herb)	OR - 26 (103) CA (Del Norte only) - 3	7(27)	27%(26%)	All occurrences are very small; all should be protected. Less than 800 plants total in OR. Southern most OR populations in WFk. CA populations need study.
Calochortus howellii (Howell's mariposa lily)	59 (1,598)	17 (253)	38% (16%)	Southern most populations in WFk. Not all what appears to be habitat is occupied. Wide variations in blooming individuals year to year. Range from Eight Dollar Mtn. South to the State border. Two occurrences in CA. need verification.
Gentiana setigera (Waldo gentian)	48 (223)	10 (47)	21% (21%)	All occurrences small, average size about 50 plants. Total population btw 3-4,000 plants. Most of habitat west side of Illinois Valley, scattered occurrences at Gasquet Mountain to Hunter Creek Bog near the coast.
Hastingsia atropurpurea Purple flowered-rush lily)	23 (147)	4 (34)	17% (23%)	Very local endemic from Rough & Ready (southern population), Woodcock Mtn and upper Josephine Creek. May be published as a variety (Lang 1994).
Lomatium cookii Cook's lomatium	23 (127 - acres for Illinois Valley only)	9 (38)	39% (30% - acres for Illinois Valley occurrences)	Occurs in two distinct areas 30 miles apart, Agate Desert/Medford Plains and the Illinois Valley. Do not have acres for the 5 occurrences in Medford area.
Microseris howellii (Howell's microseris)	49 (1,359)	15 (109)	31% (8%)	Distribution patchy & scattered, sites ranging from 20 -10,000 plants. Similar distribution as the *Senecio hesperidum*.
Senecio hesperidum (Siskiyou butterweed)	64 (1,656)	17 (162)	27% (10%)	Only 4 populations, all Josephine County. Range from Cedar Log Flat RNA to Oregon Mtn. Southern most populations in WFk.

Scientific Name (Common Name)	Total Known # of Occurrences (acres) Worldwide 4/17/97	# of Occurrences (acres) w/i W. Fork Illinois WA	% of Occurrences (acres) w/i W. Fork Illinois WA	**Important Considerations** (including important placement w/i range and genetic variability)
Streptanthus howellii * (Howell's streptanthus)	OR - 13 (84) CA - 119	8 (49) CA -N/A	6%*[1] (58% for OR acres only)	Range approximately 25 miles north to south, 16 miles east to west at widest points. This % doesn't reflect that the greatest concentration known is in Chetco drainage, Oregon (needs further data verification). Species observed to colonize road cuts and trail banks (Bio-Flora Research 1985)
Viola primulifolia ssp. *occidentalis* * (western bog violet)	OR - 17 (94) CA - 16	6 (43)	18% (46% for OR acres only)	Range is west side of Illinois Valley south to State border at Oregon Mtn , plus 3 disjunct coastal populations: Snow Camp, Hunter Creek Bog, and Ship Mtn in CA. One bog estimated to have 15,000 plants.

Wildlife Species of Concern and Their Habitats

Many species associated with the degraded habitats described in previous sections are at lower distribution and abundance than in the past. Some species, like wolves and grizzly bears, are locally extinct. Many species associated with well-connected large patches of interior older forest habitats have declined as habitats were removed or became more fragmented. These species include: northern spotted owl, pine marten, fisher, pileated and some other woodpeckers, and red tree vole.

Species associated with younger forest conditions include deer and elk. Elk are occasional visitors to the analysis area. Market hunting probably occurred, depleting elk herds in the decades of settlement following displacement of Native Americans (ODFW, 1992). Loss of winter range to human habitation has prevented re-establishment of elk populations. The Oregon portion of this ecosystem is in an area designated as "elk de-emphasis area" by Oregon Department of Fish and Wildlife's recent Population Management Objectives plan (ODFW, 1994). At least 33% of the watershed is forage for deer and elk. Serpentine areas provide low quality forage. About 43% of the watershed is capable of producing optimal thermal cover. Of these acres, 65% provides thermal cover and 40% provides optimal thermal cover.

Species associated with deciduous oak/pine savannas, Jeffery pine savanna, and meadows are declining in numbers due to encroachment on these habitats. Species associated with oak/pine savannas include California Mountain kingsnake, deer, and elk. Species associated with meadows include the willow flycatcher, deer, and elk.

Species associated with talus in older forest habitat are less abundant overall, due to timber management and road building activities in managed stands removing or degrading habitat faster than it can grow back at other locations. These activities occasionally destroy habitat, but more often reduce habitat quality by decreasing humidity, when shade is removed from otherwise suitable habitat. Species associated with talus habitat in older forests include the Del Norte salamander. Serpentine areas seldom produce micro-climates suitable for Del Norte salamander habitat due to inadequate canopy closure.

Social Environment

The West Fork Illinois River watershed has been the focus of industrial development for the Illinois Valley. The old town of Waldo housed an estimated 1,500 people in 1858 (Mickenly and Frank 1995). At one time, up to 3,000 people may have worked and traded in the area (ibid.). The mining that drew the population was mostly on the East Fork Illinois River, Althouse, and Sucker Creeks. However, Indian Hill, French Flat, and the Waldo area itself were hydraulically mined and are near or within the West Fork. "In these areas, streambeds were virtually turned upon themselves...the effect upon anadromous fish was more pronounced in the fall, when lower water levels and stream turbidity created an environment detrimental to the fall runs of chinook and coho salmon. The winter residence of these species was also impacted...marsh areas were among the most intensely disturbed (Ibid.)."

The mining boom diminished toward the turn of the century. During the 1920's, the Highway Department decided to straighten out Highway 199 and bypass Waldo. In 1928 the last store and post office in Waldo closed. Today, the townsite is used as a mushroom camp. Artifacts from historic mining, including the contributions of hundreds of Chinese people, can be found throughout the watershed.

Early routes between Crescent City and southern Oregon traversed the West Fork watershed from Oregon Mountain, via the McGrew Trail to Waldo, and on to the Applegate Valley and other points east and south. A toll station existed at Bains Station in the upper West Fork along the route.

Today, the largest lumber mill in the Illinois Valley, the airport, and another of the valley's largest employers (Fire Mt. Gems) is on Hwy 199 as it follows the West Fork Illinois River south to O'brien. Community Economic Development proposals center around the airport as an area of industrial expansion and business incubation. Community proposals to promote tourism and interpretation of the unique serpentine ecology also focus on the West Fork watershed, primarily in the Rough and Ready subwatershed. Oregon State Parks, Bureau of Land Management, the Illinois Valley Community Response Team, and the Illinois Valley Garden Club have partnered to block off-road vehicles traffic from the Rough and Ready Botanical Wayside and Area of Critical Environmental Concern and develop wheelchair accessible interpretive trails for the area.

The Community Response Team, Forest Service and Oregon State Parks have partnered to develop tourist facilities at the Forks State Park. An ampitheater intended for community concerts, plays, and other events would be constructed in the Park. The Illinois Valley, along with other parts of Josephine County, have been designated an Enterprise Community due to high unemployment and poverty, economic dependency on the timber industry, and other social factors. The Enterprise Community designation has led to an infusion of federal and state grants for infastructure and other aspects of economic development.

The southeastern portion of the watershed (Elk and Wood Creeks and their tributaries) is comprised of a large block of non-serpentine habitat (soils are derived from parent materials other than peridotite). Stands of dense, large conifers grow on these slopes. Approximately 5,000 acres of Elk and Wood Creeks are owned by commercial timber companies. Much of this timberland is in a second growth condition (based on satellite imagery). The federal lands in Elk and Wood Creeks have also been managed for timber production.

Other forest products marketed from the watershed include mushrooms and manzanita. BLM lands in the watershed near Waldo have housed hundreds of migrant mushroom pickers during the fall. Many of the mushroom pickers and buyers are of Asian descent. This influx of people with different languages and cultural habits creates social situations that would not otherwise occur in Southern Oregon. By the same token, forest and farm workers of Latin American descent have also become part of Southern Oregon communities that are predominantly Caucasion.

Mineral Potential

Placer gold deposits, copper and gold-bearing massive sulfides, gold-bearing hydrothermal alteration zone deposits, chromium pods and nickel laterites are located in the watershed.Gold mineralization is found in quartz veins and shear zones within the metamorphic and sedimentary rocks in the eastern part of the watershed (non-serpentine, see Map 4). Scattered intrusions of diorite (see Map 4) are associated with minor gold, copper and molybdenite mineralization near contacts with older rocks. Extensive hydraulic mining yielded gold from the upland gravels (Llano de Oro Formation) of the Waldo and Esterly Lakes area in one of the most productive gold-platinum placers in Oregon (Ramp and Peterson, 1979). Large areas underlain by Llano de Oro remain, some within the watershed.

Map #11 is from the Mineral Locality Map of Josephine County (DOGAMI, 1979). Of note is the Turner-Albright sulfide deposit (#444) which contains economic amounts of gold, silver, copper, zinc, and cobalt with moderate future development potential. Gold-bearing hydrothermal zones at the Alberg (#391) and Reynolds Copper (#412) have no or small future potential (Ramp and Peterson, 1979).

Chromium pods are segregated within the ultramafic rocks. Nine separate localities have been explored or mined during WWI, all with none to small future potential (ibid.).

Nickel laterite deposits were also mapped by Ramp and Peterson (1978 and 1979). The Rough and Ready Group (#392) includes several hundred acres of red soil with an average nickel content of 0.8%, with large to moderate future potential. Ramp describes each of the deposits in this Group with respect to estimated area, origin, maximum and average depths, percentage unweathered rock, and sample assays for nickel, cobalt, chromium and iron content. Rough and Ready Outwash (#392a) covers 1100 acres underlain by red soil with an estimated 90% volume of unweathered rock, having large to moderate future potential also. Moderate potential is present for Rough and Ready bench (#390 - 115 acres) and for Cedar Springs (#438 - 1500 feet east of old McGrew wagon road). For the laterites in Rough and Ready Creek watershed, the better developed ridge-top and bench deposits generally increase in grade with depth, but transported and outwash gravel deposits do not (ibid.).

The Briggs Creek Watershed Analysis (USDA 1997) summarizes the role of mineral development in Josephine County. Gold mining was once a dominant contributer to the local economy. Today, mining of precious metals does not offer the same level of contribution, for instance, total employment from mining in Jospehine County was 57 jobs, primarily in the sand and gravel industry. Small mining operations provide for the livelihood for some people who may not be counted in the county statistics. These people value the lifestyle associated with working their claims. Watershed-specific data is unavailable, and is probably not the appropriate scale for economic anlaysis.

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WATERSHED ANALYSIS TECHNICAL APPENDICIES

The West Fork Watershed Analysis (Iteration 1.0) was initiated February 1997. The analysis process followed the six steps outlined in the Federal Guide to Watershed Analysis (USDA, USDI 1995). Specialist reports, reference lists, and other analyisis records are on file at the Illinois Valley Ranger District. Technical Appendicies are listed here for reference.

Key Questions and Analysis Elements
Physcal Setting/Geology/Hydrology Report
Botanical Resources Report
Port-Orford-cedar Report
Fisheries Report
Wildlife Report
Packet of Letters "Why Rough and Ready Creek watershed is Important to Me"

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